

REMARKS

This application has been carefully reviewed in light of the Office Action dated March 21, 2002. Claims 37 and 41 have been amended. A marked-up version of these claims, showing changes made, is attached hereto as Appendix A. Claims 37 and 39-45 are pending in this application. Applicant reserves the right to pursue the original claims and other claims in this application and other applications. Applicants request that the Examiner please reconsider the above-referenced application in light of the following remarks.

Claims 37 and 39-45 stand rejected under 35 U.S.C. § 102(e) as being unpatentable over Hayashi et al. (U.S. Patent No. 6,265,738) ("Hayashi"). Reconsideration is respectfully requested. The Office Action does not indicate its rationale for rejecting claims 37 and 39-45. Accordingly, withdrawal of the rejection is solicited.

Claims 37 and 39-45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi et al. (U.S. Patent No. 6,265,738) ("Hayashi"). Reconsideration is respectfully requested.

Amended claim 37 recites a capacitor comprising "a first and second electrode . . . wherein at least one of said first and second electrodes comprises a uniformly thin and continuous platinum group metal having a uniform thickness of from about 50 Angstroms to about 1000 Angstroms . . . formed . . . with a combined flow rate . . . of from about 1500 sccm to about 2500 sccm." (emphasis added). These are important features of the claimed invention.

Amended claim 41 refers to "a first electrode and a second electrode . . . wherein at least one of said first and second electrodes comprises a uniformly thin and continuous platinum group metal having a uniform thickness of from about 500 Angstroms to about 700 Angstroms . . . formed . . . at a pressure of from about 10 to about 1000 Torr." (emphasis added). These are also important features of the claimed invention.

Hayashi fails to suggest a “first electrode and a second electrode” that has a “uniformly thin and continuous platinum group metal” (Applicant’s Specification, page 2, line 5), as recited in amended claim 37 and 41. The recitation of the platinum group metal’s characteristics are structural limitations. The claims were amended to emphasize these important features.

In contrast to the present invention, FIG. 4 of Hayashi specifically illustrates surface irregularities 416, 418, 426 on the bottom and top electrode’s surfaces (Col. 8, lines 17-20). Accordingly, the platinum layer in Hayashi is not uniformly thin or continuous. These structural differences between the present invention and cited reference provide a basis for withdrawal of the rejections.

Hayashi also fails to suggest a “platinum group metal having a uniform thickness of from about 50 Angstroms to about 1000 Angstroms,” as recited in amended claim 37, or “a uniform thickness of about 500 Angstroms to about 700 Angstroms,” as recited in amended claim 41 (emphasis added). The recitation of the “uniform thickness” of the platinum group metal is a structural limitation which distinguishes the invention over the prior art. (See Hayashi Fig. 4, 414 and 428 illustrating a non-uniform thickness).

Moreover, in contrast to the present invention, Hayashi teaches away from using materials below 500 Å. Hayashi suggests that materials “thinner than about 500 Å crystallize differently and show porosity along grain or domain boundaries, which makes them unsuitable for use.” (Col. 5, lines 17-21).

Further, Hayashi discloses a platinum layer 410 that is 1500 Å or 3000 Å thick. (Col.7, lines 24-30). Therefore, Hayashi teaches a platinum layer that is minimally 1500 Å thick. In addition, Hayashi fails to suggest utilizing different ranges outside the ones disclosed for a platinum layer. (Col. 7, lines 27-30). Accordingly, these structural differences between the present invention and cited reference provide an additional basis for withdrawal of the rejections.

Claims 37 and 39-45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Woo et al. (U.S. Patent No. 6,054,331) (“Woo”). Reconsideration is respectfully requested.

Woo teaches a method for depositing a platinum layer 116 (comprising two separate platinum films 108 and 112) for a bottom electrode. (Col. 6, lines 25-29). Woo discloses that the platinum layer is 2000 Å thick. (Col. 10, lines 25-67; Col. 11, lines 1-55).

However, Woo fails to suggest first and second electrodes “wherein at least one of said first and second electrodes comprises a uniformly thin and continuous platinum group metal having a thickness of from about 50 Angstroms to about 1000 Angstroms,” as recited by amended claim 37; or is “a uniformly thin and continuous platinum group metal having a thickness of from about 500 Angstroms to about 700 Angstroms,” as recited by amended claim 41 (emphasis added).

Woo also fails to suggest or disclose a platinum group metal with the dimensions and qualities formed at such operating conditions as recited by amended claims 37 or 41. Specifically, Woo does not disclose a “uniformly thin and continuous platinum group metal,” or with “uniform thickness.” (emphasis added). Woo merely discloses a platinum film 116 comprising annealed platinum layers 108 and 112. Platinum layer 108 is only formed to a “thickness so that it can prevent oxygen.” (Col. 6, lines 38-39). Woo is void of any teaching that the platinum layer is uniformly thin or has a uniform thickness. Accordingly, withdrawal of the rejection of claims 37 and 39-45 is respectfully requested.

Further, Applicants have shown that the claimed structure is different than the structures claimed by the processes in Hayashi and Woo. In the claimed invention, amended claims 37 and 41 recite limitations which distinctly claim the product for which protection is sought: a capacitor platinum electrode comprising a platinum group metal formed as a result of a particular deposition process, “in the presence of both oxygen and nitrous oxide” and under predetermined and specific temperature, pressure and combined

flow rate ranges. Because amended claims 37 and 41 recite structural limitations which are the result of these particular deposition parameters, and which cannot be adequately described in any other manner, amended claims 37 and 41 are proper.

Claims 39-40 depend from claim 37 and claims 42-45 depend from claim 41, and are allowable for at least those reasons described above.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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APPENDIX A

37. (four times amended) A capacitor comprising:

a first electrode and a second electrode, wherein at least one of said first and second electrodes is formed of a material selected from the group consisting of Ru, Rh, Pd, Os, Ir and Pt;

a dielectric provided between said electrodes; and

wherein at least one of said first and second electrodes comprises a uniformly thin and continuous platinum group metal having [has] a uniform thickness of from about 50 Angstroms to about 1000 Angstroms, [and is formed of a continuous platinum group metal] said platinum group metal formed in the presence of both oxygen and nitrous oxide at a predetermined ratio with a combined flow rate in the range of from about 1500 sccm to about 2500 sccm.

41. (four times amended) A capacitor comprising:

a first electrode and a second electrode, wherein at least one of said first and second electrodes is formed of a material selected from the group consisting of Ru, Rh, Pd, Os, Ir and Pt;

a dielectric provided between said electrodes; and

wherein at least one of said first and second electrodes [has a] comprises a uniformly thin and continuous platinum group metal having a uniform thickness of from about 500 Angstroms to about 700 Angstroms, said platinum group metal [and is a smooth and continuous platinum electrode] formed by depositing platinum in a CVD deposition chamber in the presence of both oxygen and nitrous oxide at a predetermined temperature and at a pressure of from about 10 to about 1000 Torr.